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COST OF CONSTRUCTION AND CAPITAL INVESTMENT
IN SELECTED PLANTS OF THE SOVIET AIRCRAFT INDUSTRY:
GOR'KIY AIRFRAME PLANT ORDZHONIKIDZE NO. 21

CIA/RR EP SC 65-16

(ORR Project No. 33.4692A)

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FOREWORD

This publication is an engineering estimate of the cost of replacement of Gor'kiy Airframe Plant Ordzhonikidze No. 21 and is one of a series of cost estimates of aircraft facilities. It is intended for use as one basis of industrial and production analysis. In establishing the cost of replacement, a construction/capital-investment ratio common to construction costs was used in all computations.

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COST OF CONSTRUCTION AND CAPITAL INVESTMENT
IN SELECTED PLANTS OF THE SOVIET AIRCRAFT INDUSTRY:
GOR'KIY AIRFRAME PLANT ORDZHONIKIDZE NO. 21*

Summary and Conclusions

The total cost of construction of Gor'kiy Airframe Plant Ordzhonikidze No. 21 is estimated to be US \$49 million, or 28 million rubles.** Based on the estimated relationship between the cost of construction and total fixed capital assets for this industry,*** total capital investment (which includes cost of construction) at this plant is estimated to be US \$111 million, or 62 million rubles.

Expansion of the original plant, built in 1931-33, was noted in 1955. Construction activity has continued to the present time with major emphasis on the machine/workshop and assembly types of structures. At present, activity is noted on two structures. The taxiway connecting the plant area with the Gor'kiy/Sormovo Airfield is estimated to have cost \$600,000.

* The estimates and conclusions in this publication represent the best judgment of this Office as of 15 July 1965.

** Throughout this publication, dollar values are given in 1963 US dollars, and ruble values are given in new rubles expressed in 1955 prices. Dollar values in 1963 prices have been deflated to 1955 prices by multiplying 1963 prices by a factor of 0.792, and then converted to new rubles in 1955 prices at the 1955 ruble-dollar ratio of 0.71 ruble to US \$1 for all industrial construction. The factor for the direct conversion of 1963 dollars to 1955 rubles is 0.562.

*** For a detailed methodology, see source 1/. (For serially numbered source references, see the Appendix.)

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I. Introduction

Gor'kiy Airframe Plant Ordzhonikidze No. 21 is located approximately 3.7 nautical miles (nm) west of the Oko River and 2 nm southwest of the Volga River in the Sormovo district of Gor'kiy. The area within the plant boundary wall is approximately 198 acres. The plant is connected by taxiway to the Gor'kiy/Sormovo Airfield, located about 1 nm to the west, and is served by highway and rail. Originally built in 1931-33, it suffered only slight damage during World War II. In 1945 the Lavochkins Special Design Bureau, which had been connected with the plant, was moved to Moscow. From 1945 to 1955 there were no major additions to the plant. In 1955, construction activity was apparent and has continued in varying degrees to the present. 2/

The plant layout and the identification of the major buildings, by type, used as a basis of estimating construction costs in this publication are shown in the chart.* The share of the total building cost found to apply to the different types of buildings is shown in the following tabulation:

<u>Type of Building</u>	<u>Percentage Share of Total Cost of Buildings</u>
Engineering/administration**	10
Forge/foundry	2
Machine/workshop	27
Assembly	48
Storage	5
Miscellaneous/unidentified	8
Total	<u>100</u>

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* Unless otherwise indicated, identification and dimensions of the buildings are from published CIA/PID reports and from reports of this Office.

** An area equal to 4 percent of the roof area was used in costing this function.

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II. Methodology

A. General

Construction costs in this publication are based principally on 1963 unit costs prevailing in an area of the US having climatic conditions analogous to Gor'kiy.

B. Climatic and Soil Data 4/

The climate of Gor'kiy is roughly similar to that of Duluth, Minnesota, being characterized by long cold winters, short warm summers, and moderate precipitation and snow cover.

Plant No. 21 is located on flat to slightly rolling terrain less than 50 feet above the Volga River water level. For installations having foundations less than 10 feet deep, conditions below the level of frost (absolute maximum of 6 feet) range from fair to good. For installations requiring deeper (more than 10 feet) excavations, conditions range from poor to fair. The water table is always less than 25 feet.

C. Physical Facilities 5/

The major buildings are of steel frame and sheet or brick construction. Roofs vary both in design (gable, flat, and monitor) and in material (concrete, slab, or sheet metal).

D. Cost of Construction and Capital Investment

The cost of construction of those items in the category of building construction has been estimated on the basis of the volumetric unit cost for the particular types of structures. Heavy construction costs are estimated on the basis of plant size, work force, construction season, and foundation conditions.

Capital investment was determined from the total cost of construction for each period of time. The amount of construction work as a share of fixed capital assets is known for a number of Soviet industries as of 1 January 1956. The share of construction in fixed capital assets used in this publication is the same as that of the Soviet automobile

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industry,* or 44.7 percent. 6/ Capital investment and cost of construction, distributed over time, are shown in the table.

III. Limitations

Available data do not warrant or allow the precise cost estimate that is inherent to competitive US industry. Assumptions, the validity of which cannot be checked, have been made on the basis of experience. The measurements used for the determination of building volume are considered to be the most complete to date; however, data on facilities normally built by heavy construction forces are scarce. On the basis of a belief that errors in the assumptions will tend to balance out, the probable range of error of plus or minus 25 percent has been estimated.

* Data are not available on the ratio of the cost of construction to fixed capital assets for the Soviet aviation industry. Of the data available, those relating to the automotive industry are estimated to be most applicable. Although the reported figure of 44.7 percent has been used, it should not be construed to mean that the figure is accurate to a tenth of a percent.

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USSR: Capital Investment and Cost of Construction of Gor'kiy Airframe Plant Ordzhonikidze No. 21 a/
Pre-1941 - January 1965

	Thousand 1963 US \$					Total	
	Pre-1941	January 1941 - July 1960	August 1960 - December 1961	January 1962 - July 1963	August 1963 - January 1965	Thousand 1963 US \$	Thousand New Rubles <u>b/</u>
Capital investment <u>c/</u>	65,828	8,653	12,226	16,749	7,179	110,635	62,177
Of which:							
Construction	29,425	3,868	5,465	7,487	3,209	49,454	27,793
Buildings	28,106	3,820	5,408	7,451	3,175	47,960	26,954
Engineering/ administration	2,754	443	590	590	540	4,917	2,763
Forge/foundry	756					756	425
Machine/workshop	7,815	1,185	1,563	1,503	1,000	13,066	7,343
Assembly	13,250	2,000	3,000	5,000		23,250	13,066
Storage	2,339					2,339	1,315
Miscellaneous/ unidentified	1,192	192	255	358	1,635	3,632	2,041
Heavy	1,319	48	57	36	34	1,494	840

a. For purposes of estimation and comparison, the data shown here have not been rounded. The data, however, are believed to be accurate as to general magnitude.

b. Expressed in 1955 prices.

c. Derived from costs of construction.

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APPENDIX

SOURCE REFERENCES

1. CIA. CIA/RR EP SC 64-16, Cost of Construction and Capital Investment in the Dnepropetrovsk Missile Development and Production Center, 30 Oct 64, p. 8-11. TS CHESS RUFF/NO FOREIGN DISSEM. 25X1A
2. CIA. OCR/FIB Summary Sheet 7010710, 1 Apr 60. S.
3. [REDACTED]
4. CIA. CIA/RR GB 65-8, Climate and Soil Data on Gor'kiy, USSR, Feb 65. S.
5. CIA. OCR/FIB Summary Sheet 7010710, 1 Apr 60. S.
6. CIA. CIA/RR EP SC 64-16 (1, above).

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